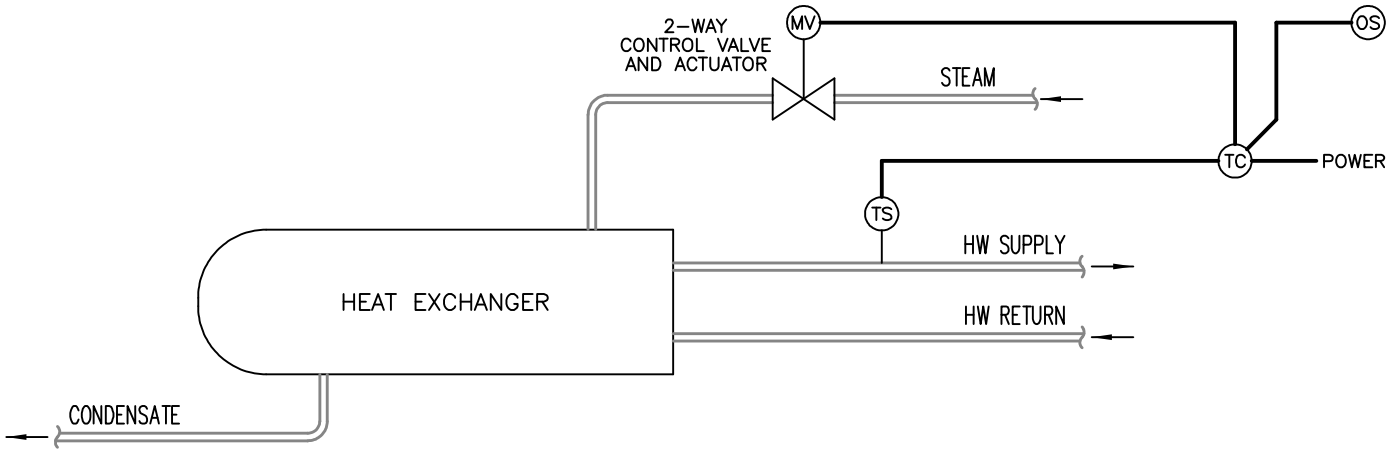
CONTROLS
ESTIMATING
AND
DESIGN
GUIDELINE

APPLICATION EXAMPLE #2

Steam to Hot Water Heat Exchanger

- **5# steam**
- **Steam capacity is 1100 lbs/hr**
- **Hot water temperature reset based on outside air temperature**

HEAT EXCHANGER – SINGLE VALVE CONTROL



DESCRIPTION

Steam to hot water heat exchanger. The hot water temperature is controlled by modulating a single steam valve. Control is either straight temperature control, or reset control based on outside air temperature. Refer to valve sheets for steam valve and actuator.

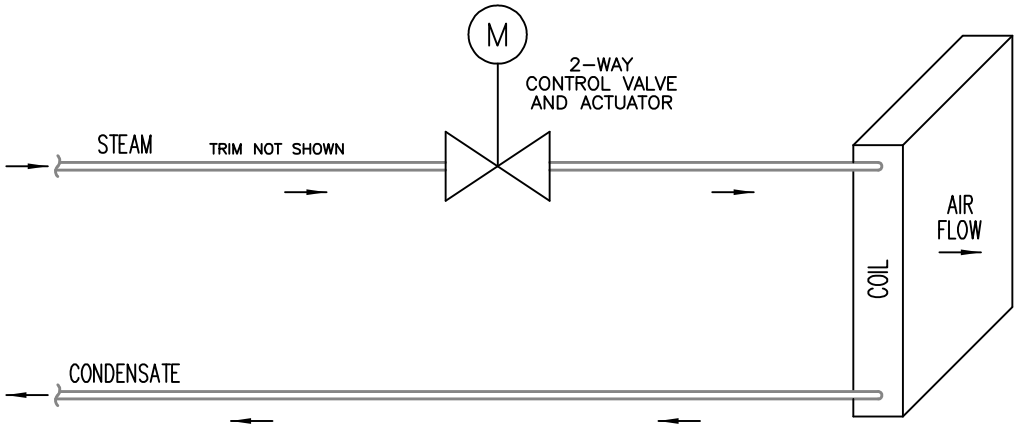
COMPONENTS

	NOTES	LABOR (hours)	MATERIAL (cost)
~~(TC) TEMPERATURE CONTROLLER (or)~~	~~1 2~~	~~10.0~~	~~160.00~~
(TC) RESET CONTROLLER	1 2	10.0	300.00
(TS) HOT WATER TEMPERATURE SENSOR (and)	3	2.0	30.00
(OS) OUTSIDE AIR TEMPERATURE SENSOR	4	2.0	30.00
(MV) MOTORIZED STEAM VALVE	5 6 7	-----	*970.00*
STARTUP AND COMMISSIONING: 4 hours	TOTALS:	14.0	$1330.00
ENGINEERING TIME: 8 hours			

NOTES

1. Determine whether the application calls for straight hot water temperature control, or hot water temperature reset control based on outside air temperature. Delete the controller not chosen.
2. Temperature controller labor includes mounting and power, and wiring to the valve. Temperature sensor wiring back to the temperature controller is included in the labor factor of the temperature sensor(s).
3. Hot water temperature sensor labor includes installation in the supply piping.
4. Delete this item if not using the reset controller.
5. Electrical labor associated with the valve is included in the labor factor of the temperature controller.
6. For the steam valve, select the valve as outlined on the modulating steam control valve sheet. Insert the valve price in the space provided.
7. A good rule of thumb is that if the size of the selected valve is larger than 2", then dual valve control should be used in lieu of single valve control. Refer to dual valve control heat exchanger sheet.

CONTROL VALVES – TWO–WAY BODIES, MODULATING CONTROL STEAM



DESCRIPTION

Two–way control valve with electric valve actuator suitable for modulating control of steam. Typical applications include modulating control of steam flow through a steam coil or through the steam side of a steam to hot water heat exchanger.

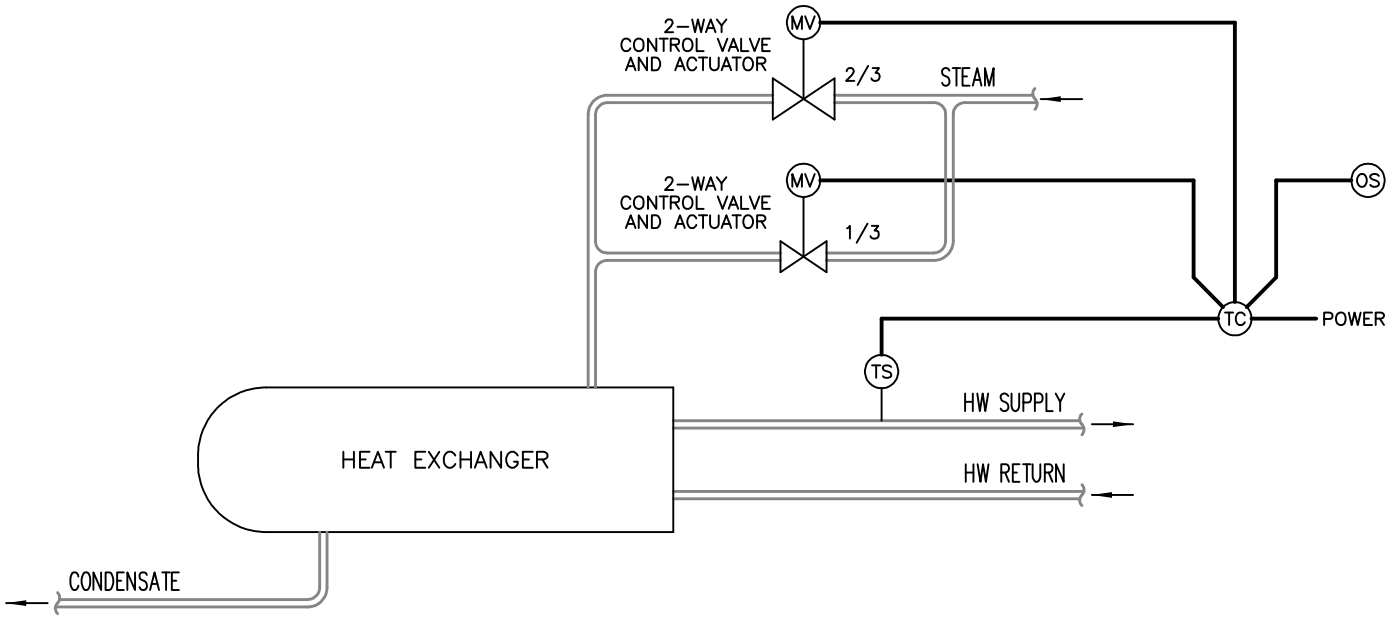
VALVE PRICING TABLE

	MAXIMUM CAPACITY IN LBS/HR			GLOBE VALVES	
SIZE	5# STEAM	10# STEAM	15# STEAM	SPRING RETURN	NON–SPRING RETURN
1/2"	59	87	109	430.00	340.00
3/4"	147	215	271	440.00	350.00
1"	250	364	459	450.00	360.00
1–1/4"	380	555	700	490.00	395.00
1–1/2"	475	693	875	670.00	405.00
2"	940	1370	1720	680.00	500.00
2–1/2"	1545	2254	2842	970.00	760.00
3"	2377	3468	4372	1040.00	830.00
4"	4000	5800	7300	1225.00	1015.00

NOTES

1. Valve pricing based on Delta valves with Belimo 24 volt actuators. Control signal to actuator is 2–10 vdc.
2. Globe valves selected here have standard trim.
3. To select the proper size valve for the application, the steam pressure and the steam capacity must be known. The steam capacity for the application will fall between two values on the table. Select the higher value and use this row to select the valve.
4. The valves selected here are "middle of the road". There are cheaper and more expensive alternatives.

HEAT EXCHANGER – DUAL VALVE CONTROL



DESCRIPTION

Steam to hot water heat exchanger. The hot water temperature is controlled by modulating two steam valves in sequence; one sized for 1/3 the total capacity, and one sized for 2/3 the total capacity. Control is either straight temperature control, or reset control based on outside air temperature. Dual valve control is required for larger capacity heat exchangers, where a single valve is too large to adequately control the steam. Refer to single valve control heat exchanger sheet for this criteria. Refer to valve sheets for steam valves and actuators.

COMPONENTS

		NOTES	LABOR (hours)	MATERIAL (cost)
TC	~~TEMPERATURE CONTROLLER (or)~~	[1] [2]	~~10.0~~	~~160.00~~
TC	RESET CONTROLLER	[1] [2]	10.0	300.00
TS	HOT WATER TEMPERATURE SENSOR (and)	[3]	2.0	30.00
OS	OUTSIDE AIR TEMPERATURE SENSOR	[4]	2.0	30.00
MV	1/3 CAPACITY MOTORIZED STEAM VALVE	[5] [6]	-----	*490.00*
MV	2/3 CAPACITY MOTORIZED STEAM VALVE	[5] [7]	-----	*680.00*
	STARTUP AND COMMISSIONING: 8 hours	TOTALS:	14.0	$1530.00
	ENGINEERING TIME: 12 hours			

1/3 CAP. = 366.6 #/hr
2/3 CAP. = 733.3 #/hr

NOTES

[1] Determine whether the application calls for straight hot water temperature control, or hot water temperature reset control based on outside air temperature. Delete the controller not chosen.

[2] Temperature controller labor includes mounting and power, and wiring to the valves. Temperature sensor wiring back to the temperature controller is included in the labor factor of the temperature sensor(s).

[3] Hot water temperature sensor labor includes installation in the supply piping.

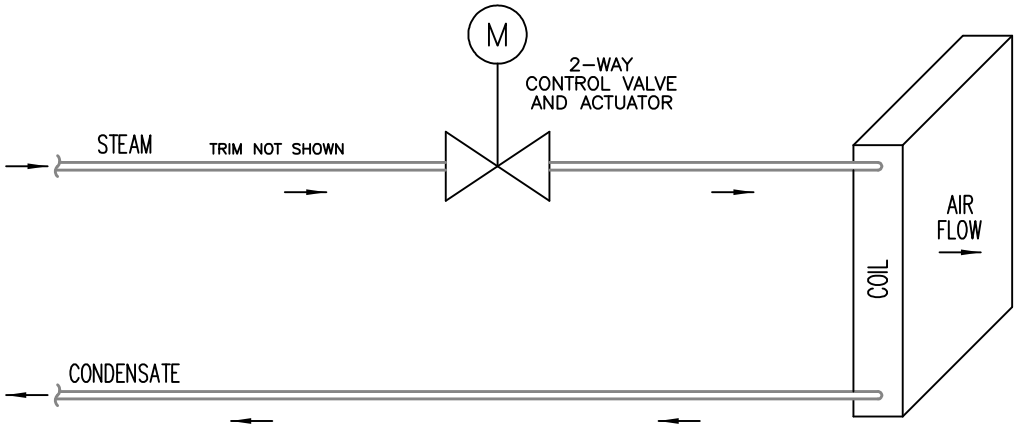
[4] Delete this item if not using the reset controller.

[5] Electrical labor associated with the valves is included in the labor factor of the temperature controller.

[6] To select the 1/3 steam valve, follow this procedure: multiply the total steam capacity (lbs/hr) by 1/3. Use this value to select the valve as outlined on the modulating steam control valve sheet. Insert the valve price in the space provided.

[7] To select the 2/3 steam valve, follow this procedure: multiply the total steam capacity (lbs/hr) by 2/3. Use this value to select the valve as outlined on the modulating steam control valve sheet. Insert the valve price in the space provided.

CONTROL VALVES – TWO–WAY BODIES, MODULATING CONTROL STEAM



DESCRIPTION

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